

REDUCING SAMPLES OF HOT MIX ASPHALT TO TESTING SIZE FOP FOR WAQTC TM 5



Mix sample



Quartered sample

Significance

Samples of bituminous paving mixes taken in accordance with AASHTO T 168 are composites and are large to increase the likelihood that they are representative of the product being tested. Materials sampled in the field need to be reduced to appropriate sizes for testing. As a general rule, field samples should be of a size that splitting once will result in the required test sample size. It is extremely important that the procedure used to reduce the field sample not modify the material properties.

Scope

This method covers the procedure reducing samples of Hot Mixed Asphalt (HMA). The samples are to be acquired in accordance with AASHTO T 168 and the increments placed in an agency approved suitable container. The sample is to be representative of the average of the HMA being produced.

The field sample when reduced once should yield a sample of sufficient mass that combined opposite quarters of the field sample will meet the testing needs. The initial reduction of the field sample should be accomplished as close as possible to the point of sampling, this to avoid excessive cooling of the sample. The further reduction to test size may be done at this time or at another time and location as necessary.

05

Apparatus

- Flat-bottom scoop,
- Broom or brush,
- Non-stick splitting surface such as metal, paper, or heat-resistant plastic,
- Large spatulas, trowels, metal straightedge or 12 in. dry wall taping knife, sheet metal quartering device,
- Thermostatically controlled oven capable of maintaining a temperature of at least 110°C (230°F) or high enough to heat the material to a pliable condition for splitting,
- Miscellaneous equipment including trowel(s), spatula(s), hot plate, non-asbestos heat-resistant gloves or mittens, pans, buckets, and cans.

06

Sample Preparation

The sample must be warm enough to separate. If not, warm in an oven until it is sufficiently soft to mix and separate easily. Do not exceed the either the temperature or time limits specified in the test(s) method to be performed.

07

Overview

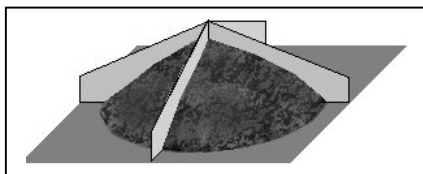
- Large Samples
- Method A: Loaf method
- Method B: Quartering by apex
- Method C: Quartering

Procedure

Large Samples, samples over 35 kg (75 lb)

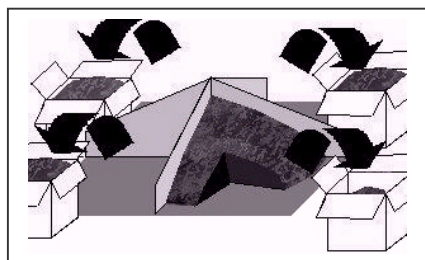
1. Heat the trowel(s), spatula(s), and splitting apparatus to approximately 110°C (230°F).
2. Place the sample on a surface where there will be neither loss of material nor the accidental addition of foreign material. The surface may be covered with a heavy paper or other suitable material. Remove the sample from the agency approved container by dumping into a conical pile.
3. Mix the material thoroughly by turning the entire sample over a minimum of four times. With the last turning, form the entire sample into a conical pile. Mixing may be accomplished by turning the pile with a heated spatula or by rolling the material over with paper or other material used for the rolling surface. Make a visual observation to determine that the material is homogenous.

Note 1: Some HMA mixes are prone to segregation; manipulation of the material should be minimized.

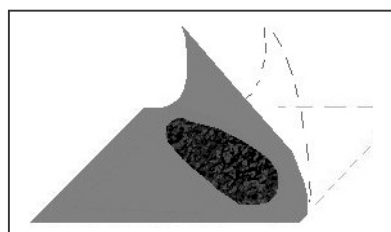


Quartering Splitter

4. Flatten the conical pile to a uniform thickness and diameter by pressing down with a hot spatula or trowel. The diameter should be four to eight times the thickness.
5. Divide the flattened pile into four approximately equal quarters with a heated spatula, trowel, flat metal plate, or sheet metal quartering splitter.
6. With the quartering device in place remove each quarter of the material and place in agency approved containers for testing, storage, or shipment. Mark containers per the Sample Identification section.



Placing into containers



Mixing HMA



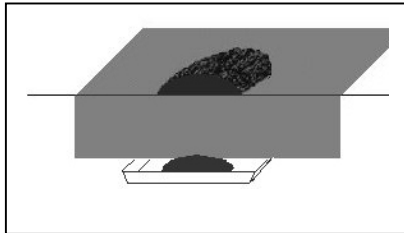
Mixing the sample

7. Pay particular attention that excessive amounts of materials are not left on the splitting surface or splitting equipment.
8. When further reduction of the HMA is to be done at this time, reduce by using methods A, B, and C. A combination of the reduction methods may be used if allowed by the agency.

Reduction to Test Size

Method A (Loaf method)

1. Place the sample on a surface where there will be neither loss of material nor the accidental addition of foreign material. The surface may be covered with a heavy paper, or other suitable material. Remove the sample from the agency approved containers by dumping into a conical pile.
2. Mix the sample thoroughly by turning the entire sample over a minimum of four times. Alternately lift each corner of the paper and pull it over the sample diagonally toward the opposite corner causing the material to be rolled. With the last turning, lift both opposite corners to form a conical pile. Make a visual observation to determine that the material is homogenous.
3. Grasp the paper, roll the material into a loaf and flatten the top.
4. Pull the paper so at least $\frac{1}{4}$ of the length of the loaf is off the edge of the counter. Allow this material to drop into a container to be saved. As an alternate, using a straightedge, slice off approximately $\frac{1}{4}$ of the length of the loaf and place in a container to be saved.



**Material dropped into
container**

17

5. Pull additional material (loaf) off the edge of the counter and drop the appropriate size sample into a sample pan or container. As an alternate, using a straightedge, slice off an appropriate size sample from the length of the loaf and place in a sample pan or container.
6. Repeat step 5 until the proper size sample has been acquired. Step 5 is to be repeated until all the samples for testing have been obtained.

Note 2 - When reducing the sample to test size it is advisable to take several small increments determining the mass each time until the proper minimum size is achieved. Unless the sample size is grossly in excess of the minimum or exceeds the maximum test size use the sample as reduced for the test.

Method B (Quartering by apex)

18

1. Place the sample on a surface where there will be neither loss of material nor the accidental addition of foreign material. The surface may be covered with a heavy paper, or other suitable material. Remove the sample from the containers by dumping into a conical pile.
2. Mix the sample thoroughly by turning the entire sample over a minimum of four times. Alternately lift each corner of the paper and pull it over the sample diagonally toward the opposite corner causing the material to be rolled. With the last turning, lift both opposite corners to form a conical pile. Make a visual observation to determine that the material is homogenous.

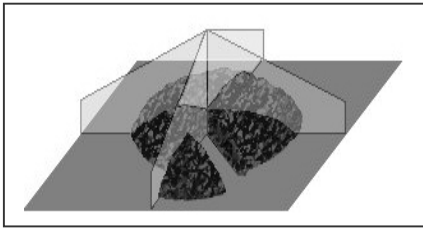
19

3. Flatten the conical pile to a uniform thickness and diameter by pressing down with a hot spatula or trowel. The diameter should be four to eight times the thickness.

4. Quarter the flattened pile using a quartering device or straightedge.

20

5. With the quartering device in place using a straightedge (taping knife) slice through the quarter of the HMA from the apex of the quarter to the outer edge. Pull or drag the material from the quarter holding one edge of the straightedge



HMA from the apex of the quarter to the outer edge.

21

(taping knife) in contact with the quartering device. Two straight edges may be used in lieu of the quartering device.

6. Slide or scoop the material into a sample pan. Repeat step 5 removing a similar amount of material from the opposite quarter. Step 5 is to be repeated until all the samples for testing have been obtained.

Note 3: When reducing the sample to test size it is advisable to take several small increments determining the mass each time until the proper minimum size is achieved. Unless the sample size is grossly in excess of the minimum or exceeds the maximum test size use the sample as reduced for the test.

22

Method C (Quartering)

1. Place the sample on a surface where there will be neither loss of material nor the accidental addition of foreign material. The surface may be covered with a heavy paper, or other suitable material. Remove the sample from the containers by dumping into a conical pile.
2. Mix the sample thoroughly by turning the entire sample over a minimum of four times. Alternately lift each corner of the paper and pull it over the sample diagonally toward the opposite corner causing the material to be rolled. With the last turning, lift both opposite corners to form a conical pile. Make a visual observation to determine that the material is homogenous.
3. Flatten the conical pile to a uniform thickness and diameter by pressing down with a hot spatula or trowel. The diameter should be four to eight times the thickness.
4. Quarter the flattened pile using a quartering device or straightedge.
5. Remove the opposite quarters saving the material for future use.
6. Repeat step 2 through 5 until the proper size sample has been achieved.

7. When additional test specimens are required, dump the removed material into a conical pile as in step 1 and repeat steps 2 through 6. This process may be repeated until sample has been reduced to testing size for all tests.

Sample Identification

1. Identify the sample as required by the agency.
2. Samples shall be submitted in agency approved containers and secured to prevent contamination and spillage.
3. The exact disposition of each quarter of the original field sample shall be determined by the agency.

Tips!

23

- Remember, the reduced sample must be representative of the whole.
- Proceed quickly so that splitting is done when the material is hot.
- Check agency requirements about what splitting device(s) may be used.
- With both methods B & C remember to combine opposite quarters to produce a sample.

REVIEW QUESTIONS

1. Describe how the material is mixed before splitting.
2. What precautions must be taken with the tools used in splitting?
3. What type of equipment can be used to split a sample of bituminous mix?
4. How are methods A, B, & C different?
5. Can methods A, B, and C be used in combination?

PERFORMANCE EXAM CHECKLIST

REDUCING SAMPLES OF HOT MIX ASPHALT TO TESTING SIZE FOP FOR WAQTC TM 5

Participant Name _____ Exam Date _____

Record the symbols “P” for passing or “F” for failing on each step of the checklist.

Procedure Element	Trial 1	Trial 2
1. Sample warmed if not sufficiently soft?	_____	_____
2. Trowels, spatulas, sheet metal quartering device (if used) heated?	_____	_____
3. Sample placed on paper, or clean, hard, and level surface?	_____	_____
4. Sample mixed by turning over a minimum 4 times?	_____	_____
Method A		
5. Rolled into loaf and then flattened?	_____	_____
6. At least ¼ of loaf removed by slicing off or dropping off edge of counter?	_____	_____
7. Proper sample size sliced off or dropped off edge of counter into sample container?	_____	_____
Method B		
8. Conical pile formed and then flattened?	_____	_____
9. Diameter equal to about 4 to 8 times thickness?	_____	_____
10. Divided into 4 equal portions with heated spatula, trowel, thin metal plate, or sheet metal quartering splitter?	_____	_____
11. With two straight edges or a splitting device and one straight edge. Was one of the quarters split from apex to outer edge of material?	_____	_____
12. Similar amount of material taken from opposite ¼?	_____	_____
13. Cleared spaces scraped clean?	_____	_____
14. Process continued until proper test size is obtained?	_____	_____
Method C		
15. Conical pile formed and then flattened?	_____	_____
16. Diameter equal to about 4 to 8 times thickness?	_____	_____
17. Two diagonally opposite quarters removed?	_____	_____

OVER

- | | | |
|---|-------|-------|
| 18. Cleared spaces scraped clean? | _____ | _____ |
| 19. Process continued until proper test size is obtained? | _____ | _____ |
| 20. Opposite quarters combined to make sample? | _____ | _____ |

Comments: First attempt: Pass ☐ Fail ☐ Second attempt: Pass ☐ Fail ☐

Examiner Signature _____ WAQTC #: _____